STI POLICY AND MANAGEMENT

Journal homepage: http://www.stipmjournal.org

The Effect of Organizational Capacity for Change to Achieve High Performance Organization in Public Research Institutions: Evidence from BRIN Indonesia

Danarsiwi Tri Lastiwi[1], Aditya Wisnu Pradana[1]*, Chandra Wijaya[2], Pantius Drahen Soeling[2], Diah Anggraeni Jatraningrum[1], Tri Hastuti[1]

[1]*Research Center for Public Policy, National Research and Innovation Agency*

[2]*Faculty of Administrative Sciences, University of Indonesia*

ARTICLE INFO

Article History:
Received : 24 June 2024
Revised : 08 July 2024
Accepted : 08 July 2024
Available online : 15 July 2024

Authorship Contribution:
All authors have equal contribution as the main authors

Keywords:
Organizational Capacity for Change, High Performance Organization, Public Research Institutions, R&D Institutions, BRIN

ABSTRACT

Strong organizational capacity is necessary to ensure a sustainable or enhanced performance during any form of change. In this regard, changing for achieving a high performance is a must for an institution. This study, through a case study at National Research and Innovation Agency (BRIN), aims to investigate the effect of organizational capacity of a public research institution for changes to achieve high R&D performance. Eight dimensions in Organizational Capacity for Change (OCC) and five dimensions in High Performance Organization (HPO) were examined. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) method. The results reveal that OCC significantly affected HPO at the 5% level, as the value of t-statistics > t-table (1.96). The influence of OCC was 0.875, meaning that an increase in the OCC resulted in a rise in HPO. Furthermore, the structural model of HPO produced an R-square value of 76.6%, reflecting the extent of the diversity of HPO that were able to be explained by the model used in this study, while the remaining (23.4%) were explained by factors outside the model. System Thinking (ST) was revealed as the most dominant dimension in OCC, indicating that BRIN's capacity for change emphasizes the importance of aligning structures, processes, people, and policy to foster adaptability and resilience. Meanwhile, Management Quality (MQ) was revealed as the most dominant dimension in HPO, indicating that it facilitates smoother transitions in BRIN during the period of organizational change to achieve better R&D performance.

* Corresponding Author. Tel: +62 812 90394282
E-mail: adit018@brin.go.id

DOI: 10.14203/STIPM.2024.396

I. INTRODUCTION

The ability of both research and development (R&D) institutions and business companies to adapt themselves for changing, surviving, and achieving prosperity is a necessity. Arundel et al. (2015) stated that organizational changes in public sector are commonly triggered by community's demands, necessitating fast, exact, and transparent responds according to their needs. Meanwhile, organizational change in the business sector is commonly triggered by external conditions, such as government regulations, technological advancements, market competition, alongside internal conditions characterized by technology that requires job specialization, organizational inaction, and previous experience of dealing with change (Armenakis & Bedeian, 1999). These conditions requires organizations to maximize their value and economy while building organizational capabilities (Beer, 2001).

Transformation in the public sector organizations is difficult due to the presence of hierarchies and mandates that govern their existence, duties, and functions (STEPI, 2021). Their change corresponds to various regulations issued by the government. This means the government is also the one who establishes legal instruments for public sector organizations, directing them to achieve higher performance. However, in terms of characters, there are striking differences between business and public sector organization. Although public sector organizations mainly focus on achieving mission rather than earning profit, their organizational goals are less sharp, as their efforts are directed towards creating social, economic, political, and cultural values (Carnes et al., 2019).

Furthermore, Rothwell et al. (2015) argued that the transformation of public sector organizations has generally been planned from the beginning and has embodied the change strategy for achieving better performance. Bushe and Marshak (2015) stated that organizational change is characterized by three elements: the strong intention to shift to an unknown situation, the disruption of current patterns by involving human resources, and the expression of collective intentions and shared motivation to achieve the improvement and performance enhancement. Also, they argued that the change process can emerge from anywhere, either inside or outside the organization.

This corresponds to a study by Boyne (2006), which stated that organizational change in the public sector is implemented through savings, shifting to new services or markets, and reorganization by changing leadership and arranging organizational management. Moreover, Karp and Helgo (2008) and Kuchinke (1995) examined organizational change by focusing on human resources and their interactions, while Kickert (2014) recommended steps to deal with change, namely ascertaining the need for this process, alongside building internal and political support.

Numerous studies have explored the changeable characteristics of organizations, including their ability to utilize necessary resources during unfavorable conditions, such as economic turbulences (Ashkenas et al., 1998), continuous innovation, the possession of an entrepreneurial spirit, and stagnancy during crises (Holbeche, n.d.). Moreover, several scholars also discussed the correlation between organizational change and its performance, such as Judge et al. (2009) and Ramezan et al. (2013), but their studies only focused on private sectors. In this context, study that examines public sector, especially public research instituton (PRI) as its research focus, is still rare.

Nowadays, PRIs should be able to adapt themselves to global demands. PRIs in several countries have proven to be able to contribute in enhancing both national economy and national competitiveness (STEPI, 2021; Pradana et al., 2022), making them an exemplary in the context of organizational change at the global level. Empirical evidence also suggested that PRIs have significantly triggered national economic growth through the provision of technologies and other forms of innovation (Triyono et al., 2020).

Establishing PRI is vital for driving innovation (Athreye & Wunsch-Vincent, 2021; Lim et al., 2022), supporting economic productivity and growth (Athreye & Wunsch-Vincent, 2021), addressing societal challenges (Aridi & Cowey, 2018; Lim et al., 2022), and developing a skilled

workforce (Athreye &Wunsch-Vincent, 2021). In Germany, a PRI named Fraunhofer has contributed to an increase in economic productivity by 0.55% (Falck, 2019; Intarakumnerd & Goto, 2018). In South Korea, the collaboration between PRIs and industries has not affected to the spin-off of PRIs itself, but has positively influenced the creation of technology licenses (Son et al., 2019). In France, a study by Giannopoulou et al. (2019) found differences in the collaboration with universities and PRIs to foster innovation. Industries that collaborate with PRIs are more likely to develop service innovations and invest less in R&D, but are able to introduce more innovations to the market. Therefore, the study suggested that companies or industries should adopt a thorough cooperation policy with either universities or PRIs with different respective contributions. In this regard, PRIs also assume a supporting role to provide benefits for both public policy and community welfare. In developed countries and emerging economies, PRIs play a vital role in the political and policy arenas of local and national level policymaking (Bach et al., 2012).

In Indonesia, the momentum of major changes in government-owned R&D institutions occurred in 2021. This was marked through the merger of all PRIs, both those that stand independently under the president and R&D units under technical ministries, into single entity named the National Research and Innovation Agency (BRIN). This was in accordance with the ratification of the Regulation of the President of the Republic of Indonesia Number 78 of 2021 concerning BRIN.

The institutional change of R&D in Indonesia through the merger of all PRIs into BRIN is the government's effort to encourage integrated research across disciplines to contribute more in realizing national competitiveness (STEPI, 2021), especially considering that research budgets were previously spread across many PRIs and were managed inefficiently (Azali & Fionna, 2015; Pradana et al., 2021). Research activities often overlapped among several PRIs and there was no collaboration of resources in conducting research (Dominata et al., 2019; Pradana et al., 2022; Triyono et al., 2020). In addition, there was no strong connectivity between research conducted by PRIs and the real needs of industries and users (Purwadi et al., 2020; Triyono et al., 2020).

Consequently, many research results in PRIs still have no significant impact; they have only ended as scientific reports and references that are considered not yet applicable, either to industries for supporting competitiveness, to governments for evidence-based policymaking, or to wider communities for promoting social welfare. Thus, based on this standpoint, strengthening R&D performance for PRIs is a must, and its implementation is only manageable if all research resources are included in the same integrated management structure. In this case, BRIN needs to act as an incubator for all research resources within its structure to continue increasing its performance (Pradana et al., 2022; STEPI, 2021). Hopefully, through the strengthening of R&D performance, the resulting impact can begin to be felt by various users of innovation so as to promote their interest to invest in R&D (STEPI, 2021).

The merger of PRIs into BRIN is in line with the spirit of boosting the organization's R&D performance. However, such efforts must be supported by BRIN's capacity for change. Using several dimensions, this study aims to investigate the BRIN's capacity for change to achieve this goals. The change caused many responses from employers and researchers, thereby necessitating the knowledge of BRIN's capacity in running the changes from several points of view, including from the employees and leaders. Subsequently, the dimensions used to measure the capacity were adopted from the theory by Judge and Douglas (2009) regarding organizational capacity for change, while the goals of an organization to achieve high performance were adopted from the theory by De Waal and Heijtel (2016).

II. ANALYTICAL FRAMEWORK

Several studies have proven the significance of the relationship between the Organization Capacity for Change (OCC) and Organizational Performance (OP). A study by Judge et al. (2009) on 86 Russian companies found a positive relationship between OCC and OP, which was strengthened during a high level of uncertainty in the organizational task environment. The

study also stated that OCC is the main variable in organizations with various sizes. This opinion was supported by Ramezan et al. (2013), using 130 industrial employees in Iran as respondents, which proved a significant, positive, and strong relationship between OCC proposed by Judge et al. (2009) and OP put forward by Lee (2008).

Meanwhile, a study by Adna and Sukoco (2020), which focused on 313 mid-managers at the Ministry of Finance, Indonesia, measured the role of OCC as a mediating variable in the relationship between Managerial Cognitive Capabilities and OP, as adopted from Lei et al. (2019). The study proved that the Trusted Followers dimension mediates the relationship among Transformational Leadership, Innovative Culture, and Capable Champions. Furthermore, Pudjiarti (2018) found that OCC and Innovative Culture strengthened the effect of Organizational Learning on OP in six private universities in Indonesia. Likewise, Delaney and Huselid (1996), using 727 companies in the United States as respondents, also found a positive and significant correlation between organizational change driven by Human Resource Management and OP.

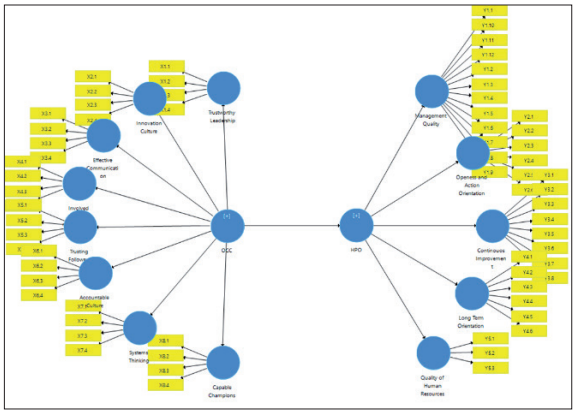
Referring to these previous studies, it can be ascertained that issues related to the correlation between an organization's capacity for change and its performance have been already commonly studied. However, there have been no previous studies that specifically link this correlation in the context of PRIs. Instead, their research scopes are still limited to the university environment, as in a study by Pudjiarti (2018). The changes in public organizations was discussed by Van der Voet (2014), but those of R&D institutions were not specifically investigated. Moreover, empirical studies on the PRIs and their performance mostly focused on evaluating their commercialization, research collaboration, technology transfer, and innovation (Băzăvan, 2019; Cheah & Ho, 2020; Chung, 2001; Gershman et al., 2018) and did not specifically examine the organizational change. Therefore, understanding the correlation between an organization's capacity for change and its performance in the context of PRIs is a novelty offered in this study.

In addition, the selection of BRIN as a research locus was also viewed as a unique focus to expand the knowledge horizon in this research niche, especially considering that the practice of organizational change by BRIN, namely uniting all PRIs in Indonesia into a single institution, is considered the one of its kind worldwide. The common practice across many countries is to allow each PRI to remain independent, while its policy, program, and activities are coordinated by a ministry or government institution authorized by country's constitution. However, uniting all PRIs into BRIN is the Indonesian government's effort to fix coordination and collaboration problems and further encourage improvements in the research and innovation ecosystem. Therefore, in line with the aim of this change to improve national R&D performance, this study also focuses to understand the correlation between BRIN's capacity for change and its performance by examining various dimensions of BRIN's organizational capacity for change to achieve high R&D performance.

Heslin and Marr (2008), Judge and Douglas (2009), and Jones-Robert (2008) argued that the capacity needed by an organization to change is called OCC. This terms is defined as a broad and dynamic capability that allows organizations to adapt their existing competencies to new threats and opportunities while creating new abilities (Judge & Elenkov, 2005). Referring to Judge and Douglas (2009), this study examines eight dimensions of OCC: Trustworthy Leadership (TL), Innovative Culture (IC), Effective Communication (EC), Involved Mid-Management (IM), Trusted Followers (TF), Accountable Culture (AC), System Thinking (ST), and Capable Champions (CC).

Hypothetically, an organization that can enhance its capacity for change will achieve high performance (Arundel et al., 2015; Judge et al., 2009; Ramezan et al., 2013). Hence, De Waal (2012) defined High Performance Organization (HPO) as an accountable organization; adaptive, agile, and flexible company; a high performance organization or system; a reliable organization; a smart company; alongside a resilient, responsive, strong, and sustainable organization. Referring to De Waal and Heijtel (2016), this study examines

five dimensions of HPO: Management Quality (MQ), Openness and Action Orientation (OA), Continuous Improvement (CI), Long-Term Orientation (LO), and Workforce Quality (WQ). The correlation model between OCC and HPO is shown in Fig. 1.



Sources: Elaborated from Judge and Douglas (2009) and De Waal and Heijtel (2016), processed by authors

Figure 1. Conceptual model proposed in this study

III. METHODOLOGY

This study employed the Structural Equation Modeling (SEM) method based on variance named Partial Least Squares (PLS). Thus, this method is also known as Partial Least Squares Structural Equation Modeling (PLS-SEM), which functions to evaluate the research variables (Ghozali & Latan, 2012).

The questionnaires regarding OCC and HPO were distributed to 75 researchers and high officials from 17 research centers and bureau at BRIN throughout 2022–2023. The research centers sampled based on the representing area where they are located, namely Jakarta, Bandung, Subang, Serpong, Bogor, Cibinong, and Yogyakarta. The dimensions of OCC were TL, IC, EC, IM, TF, AC, ST, and CC, referring to Judge and Douglas (2009). Meanwhile, the dimensions of HPO were MQ, OA, LO, CI, and WQ, reffering to De Waal and Heijtel (2016). Each dimension consisted of several indicators with a total of 63 indicators, which were used as questionnaire items in the data collection process.

Several stages of data processing were carried out in this study. First, a reliability test were performed to assess the consistency and stability of the measuring instrument (Koo & Li, 2016). This test functioned to evaluate whether the results were reproducible under consistent conditions, indicating the dependability of the data. This was decided by comparing the r-count to the r-table or probability value (p-value). The indicator was declared valid at scores where the correlation coefficient (r-count) > r-table or p-value < 0.05.

Next, the model was evaluated using the PLS-SEM method. Referring to Hair et al. (2017), Henseler et al. (2009), Sarstedt et al. (2014), and Wold (1982), this method involved assessing both the measurement model and the structural model to ensure reliability, validity, and overall quality of the model.

The measurement model evaluation focused on construct reliability and validity (Hair et al., 2017). Reliability was assessed using composite reliability and cronbach's alpha, ensuring consistency among indicators. Validity, in the form of convergent validity and discriminant validity, were measured using the Average Variance Extracted (AVE) > 0.5 and discriminant validity test, ensuring that the constructs being measured were distinct from one another. In addition, validity is also often assessed using the Fornell-Larcker criterion or the Heterotrait-Monotrait ratio.

Next, the structural model evaluation was used to examine the significance and strength of path coefficients through bootstrapping test, which provided confidence intervals and p-values (Hair et al., 2017). Additionally, the coefficient of determination (R^2) was inspected to determine the explanatory power of the model, with higher values indicating better model fit. Predictive relevance (Q^2) was also assessed using the blindfolding procedure, with values > 0 indicating predictive capability. The findings were used as analysis materials in this study.

IV. RESULTS AND DISCUSSION

A. Instrument Validity

A reliability test was conducted on all indicator items in the questionnaire to determine their validity, reffering to Koo and Li (2016). The

indicator was declared valid at scores where the correlation coefficient (r-count) > r-table or p-value < 0.05. As seen in Table 1 below, the results reveal that r-table for N = 30 (df = N–2 = 28) was 0.36, meaning all indicators were valid.

Table 1. Reliability test

Va.	Di.	Indicator	r-count	Result (valid if > 0.36)
OCC	TL	Leaders maintains the organization's core values	0.93	Valid
		Leaders provides information on the future vision	0.89	Valid
		Leaders shows the courage to support the changes	0.68	Valid
		Leaders shows humility while pursuing the future vision	0.79	Valid
	IC	Organizational culture supports innovation and change	0.87	Valid
		Organizational culture in recruiting and retaining creative people	0.88	Valid
		Organizational culture provides resources for experimenting with new ideas	0.90	Valid
		Organizational culture allows employees to take risks without blaming them in the case of failure	0.80	Valid
	EC	Information flows effectively from the leadership to the employees	0.80	Valid
		Information flows effectively and on time	0.90	Valid
		Information flows effectively throughout all levels	0.84	Valid
		Information flows effectively from stakeholders to the organization	0.89	Valid
	IM	Direct supervisor effectively links the leadership with the employees	0.76	Valid
		Immediate supervisor shows commitment to the health/well-being of the organization	0.77	Valid
		Immediate supervisor maintains a balance between tasks and change initiatives when work is done	0.80	Valid
		Immediate supervisor adequately voices your differences of opinion	0.84	Valid
	TF	Employees are open to changes in plans	0.75	Valid
		Employees can voice their concerns, objections, or considerations regarding the plan	0.84	Valid
		Employees know how these changes will advance the institution	0.78	Valid
		Employees in your institution view the leadership as trustworthy people	0.89	Valid
	AC	Employees receive the consequences for their actions	0.59	Valid
		Employees adhere to deadlines and respect the commitments	0.75	Valid
		Employees accept responsibility for completing work	0.92	Valid
		Employees have a clear role in performing their functions	0.87	Valid
	ST	Pioneers know the interrelated implications of change	0.93	Valid
		Pioneers know the importance of institutionalizing change	0.92	Valid

Va.	Di.	Indicator	r-count	Result (valid if > 0.36)
		Pioneers recognize the need to readjust incentives to desired changes	0.91	Valid
		Pioneers know the need to address the causes rather than focus on the upheavals that arise	0.91	Valid
	CC	Pioneers inspire respect from employees	0.81	Valid
		Pioneers have interpersonal skills	0.87	Valid
		Pioneers are able to change the status quo	0.82	Valid
		Pioneers have the will and creativity to promote organizational change	0.87	Valid
HPO	MQ	Organizational management is trusted by members	0.88	Valid
		Organizational management has integrity	0.87	Valid
		Organizational management is a role model for members	0.91	Valid
		Organizational management applies fast decision-making	0.81	Valid
		Organizational management implements quick action	0.77	Valid
		Organizational management guides members to achieve better results	0.88	Valid
		Organizational management is very effective	0.83	Valid
		Organizational management focuses on achieving results	0.86	Valid
		Organizational management applies strong leadership	0.87	Valid
		Organizational management are confident	0.77	Valid
		Organizational management sanctions those that perform unsatisfactorily	0.73	Valid
		Organizational management always holds members accountable for their results	0.74	Valid
	OA	Organizational management often has dialogues with employees	0.86	Valid
		Organization members spend a lot of time on communication, knowledge exchange, and learning	0.72	Valid
		Organizational members are involved in important processes	0.86	Valid
		Organizational management tolerates mistakes	0.53	Valid
		Organizational management welcomes change	0.78	Valid
		The organization is driven by performance	0.65	Valid
	CI	The organization has adopted a strategy that clearly distinguishes it from other organizations	0.83	Valid
		Organizational processes are continue to be improved	0.90	Valid
		Organizational processes are continue to be streamlined	0.76	Valid
		Organizational processes are continuously aligned	0.86	Valid
		The organization continuously innovates its core competencies	0.85	Valid
		Financial and non-financial information is reported to members of the organization	0.43	Valid

Va.	Di.	Indicator	r-count	Result (valid if > 0.36)
		Matters that are important to organizational performance are reported explicitly	0.73	Valid
		The organization continuously innovates its processes and services	0.83	Valid
	LO	The organization maintains good and long-term relationships with all stakeholders	0.93	Valid
		The organization aims to serve stakeholders maximally	0.81	Valid
		The organization grows through partnerships with stakeholders	0.82	Valid
		Organizational management have worked in the organization for a long time	0.81	Valid
		New management are promoted from within the organization	0.84	Valid
		The organization is a safe workplace for the members	0.80	Valid
	WQ	Organizational management inspires members to achieve extraordinary results	0.95	Valid
		Organizational members are trained to be resilient and flexible	0.90	Valid
		The organization have diverse and complementary employees	0.91	Valid

Sources: Data processing by authors

B. Measurement Model Evaluation

Following the confirmation that all indicators were valid, they were then assessed in the next step, namely measurement model evaluation.

Measurement model evaluation is a crucial process in Structural Equation Modeling (SEM) method, as it assesses the validity and reliability of the constructs being measured (Hair et al., 2010). Referring to Henseler et al. (2009), this evaluation involves examining the relationships between the variables observed and their underlying latent variables.

Key aspects assessed in this evaluation are construct validity (to ensure the measurement accurately reflects the theoretical concept), convergent validity (to check if the indicators of a construct highly interrelate), and discriminant validity (to ensure the constructs are distinct from one another) (Kline, 2015). Reliability is also scrutinized through measures, such as composite reliability and cronbach's alpha, to confirm internal consistency.

A measurement model must meet several conditions, including convergent validity, model reliability, and discriminant validity. The convergent validity is obtained from the loading factor value > 0.5 and the AVE value of each latent variable > 0.5. The resulting values of AVE, composite reliability, and cronbach's alpha are shown in Table 2.

Table 2. Values of average variance extracted (AVE), composite reliability, and cronbach's alpha

Va.	Di.	AVE	Composite Reliability	Cronbach's Alpha
OCC	TL	0.667	0.888	0.831
	IC	0.678	0.893	0.841
	EC	0.697	0.902	0.854
	IM	0.710	0.907	0.861
	TF	0.659	0.884	0.824
	AC	0.701	0.903	0.854
	ST	0.770	0.931	0.900
	CC	0.709	0.907	0.864
HPO	MQ	0.555	0.937	0.926
	OA	0.562	0.883	0.838
	CI	0.636	0.933	0.916
	LO	0.646	0.916	0.891
	WQ	0.806	0.926	0.880

Sources: Data processing by authors

In addition, to ensure convergent validity, it is also necessary to calculate the loading factor value, namely the coefficient that indicates the relationship strength between the variables observed and their underlying latent constructs in factor analysis (Hair et al., 2017). Specifically, it represents how well every variable observed "loads" onto a particular factor, reflecting the variable's contribution to the factor.

High loading factor value, typically > 0.7, suggest a strong association, implying that the variable observed is a good indicator of the latent construct. Conversely, low loading factor value, typically < 0.7, indicate weak association, suggesting that the variable observed may not be a reliable measure of the latent construct. Evaluating these values is essential for assessing the validity and reliability of the measurement model, as they help in determining whether the model accurately captures the underlying theoretical constructs. The resulting values of loading factor are shown in Table 3 below.

Table 3. Loading factor value

Variable	Dimension	Loading Factor
OCC	TL	0.822
	IC	0.828
	EC	0.727
	IM	0.788
	TF	0.823
	AC	0.797
	ST	0.856
	CC	0.772
HPO	MQ	0.906
	OA	0.864
	CI	0.864
	LO	0.760
	WQ	0.796

Sources: Data processing by authors

The evaluation was followed by the model reliability test to prove the accuracy and consistency of the instrument in measuring the construct. This was performed by measuring the composite reliability and cronbach's alpha of the latent variables, where those scoring > 0.7 were accepted. All the latent variables exhibited good, accurate, and consistent reliability, as shown in Table 3.

Next, the discriminant validity test was conducted using the principle that different latent variables should not have high correlations (Ghozali, 2008). Discriminant validity in measurement model evaluation refers to the extent to which a construct is truly distinct from other constructs within the model, ensuring that the measurements of different constructs do not overlap (Hair et al., 2017). This test is a key aspect of construct validity and is essential for confirming that a given measure accurately reflects the intended variable and not others.

If the AVE value for each construct is greater than the squared correlation with any other construct, discriminant validity is demonstrated. Establishing discriminant validity is critical for the robustness of a measurement model, as it assures that each construct is unique and captures the specific phenomenon being measured, thereby enhancing the overall validity of the model.

Table 4. Discriminant validity test

	TL	IC	EC	IM	TF	AC	ST	CC	MQ	OA	CI	LO	WQ
TL	**0.82**												
IC	0.72	**0.82**											
EC	0.61	0.48	**0.83**										
IM	0.64	0.65	0.51	**0.84**									
TF	0.64	0.59	0.65	0.51	**0.81**								
AC	0.51	0.61	0.49	0.59	0.67	**0.84**							
ST	0.67	0.66	0.56	0.60	0.67	0.62	**0.88**						
CC	0.50	0.59	0.43	0.55	0.59	0.61	0.67	**0.84**					
MQ	0.62	0.70	0.56	0.65	0.65	0.71	0.60	0.73	**0.74**				
OA	0.58	0.68	0.47	0.69	0.60	0.65	0.65	0.60	0.74	**0.75**			
CI	0.61	0.68	0.47	0.69	0.56	0.62	0.71	0.71	0.73	0.70	**0.80**		
LO	0.35	0.52	0.33	0.44	0.48	0.63	0.54	0.50	0.55	0.59	0.51	**0.80**	
WQ	0.47	0.52	0.34	0.52	0.42	0.60	0.62	0.60	0.60	0.63	0.60	0.77	**0.90**

Sources: Data processing by authors

Table 4 shows that the AVE value for each construct is greater than the squared correlation with any other construct. This indicates that the model met the discriminant validity requirements.

C. Structural Model Evaluation

Referring to Hair et al. (2017), structural model evaluation in PLS-SEM involves assessing the strength and significance of relationships (path coefficients) among latent variables. This is typically conducted through bootstrapping test to derive standard errors and confidence intervals for path coefficients, also to determine their significance. Additionally, the coefficient of determination (R^2) is used to evaluate how well

the model explains the variance in endogenous constructs, while predictive relevance (Q^2) is used to evaluate how well the model predicts the variance in exogenous constructs.

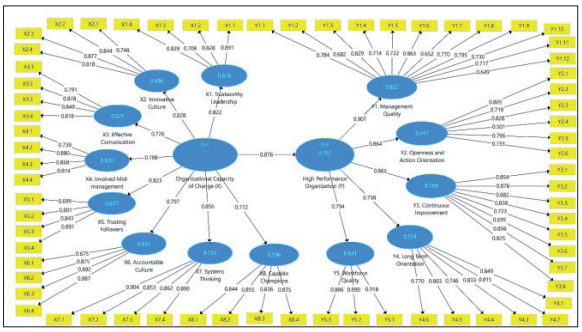
Table 5. Bootstrapping Test

Correlation of Variable	Path Coefficient	t-Statistic	R^2
OCC è HPO	0.875	31.24*	0.766

Sources: Data processing by authors

*significant at 5% level, t-statistic > t-table (1.96)

The results of bootstrapping test in Table 5 show that OCC had a significant effect on HPO at the 5% level, based on the value of t-statistics > t-table (1.96). This influence produced a path coefficient value of 0.875, meaning that an increase in OCC resulted in a rise in HPO. In addition, the HPO structural model produced an R-square value of 76.6%, denoting the extent of the diversity of HPO that were able to be explained by the model, while the remaining 23.4% were explained by external factors. The final result of the correlation is shown in Fig. 2.



Sources: Data processing by authors

Figure 2. Correlation result

As seen in Fig. 2, the most dominant dimension in measuring BRIN's capacity for change, namely the dimension of OCC with the highest loading factor value (0.856), is System Thinking (ST). Meanwhile, the most dominant dimension in measuring BRIN's R&D performance, namely the dimension of HPO with the highest loading value (0.906), is Management Quality (MQ).

D. Analysis and Discussion

By analyzing the findings, it can be concluded that strengthening BRIN's capacity for change has an effect on increasing its R&D performance. System Thinking (ST) was revealed as the most dominant dimension in measuring BRIN's capacity for change, indicating that the successful change requires addressing not just the isolated problems or components, but also the existing relationships and dynamics within the organization as a whole.

System thinking involves viewing the organization as a complex and interconnected system where various components and their interactions collectively influence the ability of all organization's member to adapt and transform themselves (Senge, 1990). Moreover, referring to Van de Voet et al. (2015), system thinking approach recognizes that changes in one part of the organization can generate ripple effects throughout the entire system. By understanding these interdependencies, leaders can better anticipate the outcomes of change initiatives so that they can design the appropriate strategies that align with the organization's overall objectives and culture.

In the context of BRIN's capacity for change, system thinking emphasizes the importance of aligning structures, processes, people, and policies to foster adaptability and resilience. It involves identifying leverage points where changes can lead to significant improvements and addressing potential resistance by understanding the underlying systemic causes. This approach has helped BRIN in creating a shared vision, promoting continuous learning, and enhancing communication across its entire organizational levels, thereby enabling the formation of a more agile and responsive entity.

This is also in line with the changes that have occurred, where BRIN was formed through the merger of all PRIs in Indonesia. Obviously, each PRI carries different values, backgrounds, and cultures. For this reason, establishing and uniting the common vision is an absolute necessity to minimize the gap of differences and accelerate the achievement of collective goals. This must be conducted by BRIN by prioritizing a system

thinking approach in organizing and managing these changes.

Meanwhile, in supporting BRIN's capacity for changes to achieve its goals, Management Quality (MQ) was revealed as the most dominant dimension in improving R&D performance. High performance organizations are characterized by optimal decision-making, strategic vision, and the ability to foster a positive organizational culture (Bloom et al., 2013). The management quality determines how these processes are possible to be carried out effectively. This quality is especially important during the periods of BRIN's transition, as competent managers can more effectively navigate the complexities of restructuring, innovation, and challenges that are brought by the uncertainty of the future.

Additionally, high quality management facilitates smoother transitions during organizational changes by aligning resources, motivating staffs, and maintaining clear communication. Previous studies, such as one by Bloom et al. (2012), illustrated that organizations with high management quality score significantly better in performance metrics across various industries, highlighting the pivotal role of management in driving both change and sustained performance improvements.

V. CONCLUSIONS

The findings of this study has revealed that OCC significantly affected HPO at the level of 5%, based on the value of t-statistics > t-table (1.96). Specifically, the influence of OCC was 0.875, denoting a concurrent increase with HPO. The structural model of HPO produced an R-square value of 76.6%, signifying the extent of the diversity of HPO that were able to be explained by the model used in this study, while the remaining 23.4% were explained by factors outside the model. Thus, further studies should be able to determine these external factors.

The overall findings show that BRIN's capacity for change has a positive and significant correlation on R&D performance. The most dominant dimensions are System Thinking (ST) in strengthening the organization's capacity for change and Management Quality (MQ) in achieving high R&D performance.

Nonetheless, as in the general characteristics of the positivistic paradigm, this study has limitations, namely only proving the theory and predicting the relationship between the organization's capacity for change and its performance by conducting a case study on the integration of all PRIs into BRIN. Thus, to broaden the knowledge horizon of this research niche, further studies need to elaborate the problems and concrete solutions that can be offered to BRIN management so that this institution is able to further increase its capacity during the period of organizational change or transition and achieve the expected R&D performance.

ACKNOWLEDGEMENT

This study was supported by science and technology funding from the Ministry of Education, Culture, Research, and Technology. We would like to express our gratitude to all researchers and respondents who had participated in this study.

REFERENCES

Adna, B. E., & Sukoco, B. M. (2020). Managerial cognitive capabilities, organizational capacity for change, and performance: The moderating effect of social capital. *Cogent Business and Management*, *7*(1), 1–23. https://doi.org/10.1080/23311975.2020.1843310

Aridi, A., & Cowey, L. (2018). *Technology transfer from public research organizations* (Issue April). https://documents1.worldbank.org/curated/en/384851539285043693/pdf/Technology-Transfer-from-Public-Research-Organizations-A-Framework-for-Analysis.pdf

Armenakis, A. A., & Bedeian, A. G. (1999). Organizational change: A review of theory and research in the 1990s. *Journal of Management*, *25*(3), 293–315. https://doi.org/10.1177/014920639902500303

Arundel, A., Casali, L., & Hollanders, H. (2015). How European public sector agencies innovate: The use of bottom-up, policy-dependent, and knowledge-scanning innovation methods. *Research Policy*, *44*(7), 1271–1282. https://doi.org/10.1016/j.respol.2015.04.007

Ashkenas, R. N., De Monaco, L.J., & Francis, S. C. (1998). Making the deal real: how GE capital integrates acquisitions. *Harvard Business Review, 76*(1), 165-70, 172, 174-8

Athreye, S., & Wunsch-Vincent, S. (2021). The evolving role of public R&D and public research organizations in innovation. In *Harnessing public research for innovation in the 21st century*. https://doi.org/10.1017/9781108904230.005

Azali, K., & Fionna, U. (2015). Research on contemporary Indonesia: Complexities and intricacies to explore. *Sojourn: Journal of Social Issues in Southeast Asia, 30*(1), 227–255

Bach, T., Niklasson, B., & Painter, M. (2012). The role of agencies in policy-making. *Policy and Society*, *31*(3), 183–193. https://doi.org/10.1016/j.polsoc.2012.07.001

Băzăvan, A. (2019). Chinese government's shifting role in the national innovation system. *Technological Forecasting and Social Change*, *148*. https://doi.org/10.1016/j.techfore.2019.119738

Beer, M. (2001). How to develop an organization capable of sustained high performance: Embrace the drive for results-capability development paradox. *Organizational Dynamics*, *29*(4), 233–247. https://doi.org/10.1016/s0090-2616(01)00030-4

Bloom, N., Eifert, B., Mahajan, A., McKenzie, D., & Roberts, J. (2013). Does management matter? Evidence from India. *Quarterly Journal of Economics, 128*(1), 1–51.

Bloom, N., Sadun, R., & Van Reenen, J. (2012). The organization of firms across countries. *Quarterly Journal of Economics, 127*(4), 1663–1705.

Boyne, G. A. (2006). Strategies for public service turnaround: Lessons from the private sector? *Administration and Society*, *38*(3), 365–388. https://doi.org/10.1177/0095399705286004

Bushe, G., & Marshak, R. J. (2015). The dialogic organization development approach to transformation and change. In *Practicing organization development: Leading transformation and change* (4th ed.). Wiley Publishing. https://doi.org/10.1002/9781119176626.ch31

Carnes, C. M., Gilstrap, F. E., Hitt, M. A., Ireland, R. D., Matz, J. W., & Woodman, R. W. (2019). Transforming a traditional research organization through public entrepreneurship. *Business Horizons*, *62*(4), 437–449. https://doi.org/10.1016/j.bushor.2019.02.002

Cheah, S. L. Y., & Ho, Y. P. (2020). Effective industrial policy implementation for open innovation: The role of government resources and capabilities. *Technological Forecasting and Social Change*, *151* (December 2019), 119845. https://doi.org/10.1016/j.techfore.2019.119845

Chung, S. (2001). Unification of South and North Korean innovation systems. *Technovation*, *21*(2), 99–107. https://doi.org/10.1016/S0166-4972(00)00025-0

De Waal, A. A. (2012). Characteristics of high performance organisations. *Journal of Management Research*, *4*(4), 39–71. https://doi.org/10.5296/jmr.v4i4.2062

De Waal, A. A., & Heijtel, I. (2016). Searching for effective change interventions for the transformation into a high performance organization. *Management Research Review*, *39*(9), 1080–1104. https://doi.org/10.1108/MRR-04-2015-0094

Delaney, J. T., & Huselid, M. A. (1996). The impact of human resource management practices on perceptions of organizational performance. *Academy of Management Journal*, *39*(4), 949–969. https://doi.org/10.2307/256718

Dominata, A., Pradana, A. W., & Wahjono, E. (2019). Membangun kebijakan jaring pengaman teknologi untuk mendorong produktivitas hasil riset Indonesia. *Wacana Hukum, 25*(1), 118–124. https://doi.org/10.33061/wh.v25i2.3310

Falck, O., Koenen, J., & Lohse, T. (2019). Evaluating a place-based innovation policy: Evidence from the innovative Regional Growth Cores Program in East Germany. *Regional Science and Urban Economics*, *79*, 103480. https://doi.org/10.1016/j.regsciurbeco.2019.103480

Gershman, M., Gokhberg, L., Kuznetsova, T., & Roud, V. (2018). Bridging S&T and innovation in Russia: A historical perspective. *Technological Forecasting and Social Change*, *133*, 132–140. https://doi.org/10.1016/j.techfore.2018.03.014

Giannopoulou, E., Barlatier, P. J., & Pénin, J. (2019). Same but different? Research and technology organizations, universities and the innovation activities of firms. *Research Policy*, *48*(1), 223–233. https://doi.org/10.1016/j.respol.2018.08.008

Ghozali, I. (2008). *Structural equation modeling*. (2nd ed.). Semarang: Diponegoro University Press.

Ghozali, I., & Latan, H. (2012). *Partial least square: Concept, technique, and application of Smart PLS 2.0 M3*. Semarang: Diponegoro University Press.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis*. Pearson.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing, *Advances in International Marketing, 20*, 277–319.

Heslin, K., & Marr, J. A. (2008). Building organizational capacity for change. *Healthcare Management Forum/Canadian College of Health Service Executives = Forum Gestion Des Soins de Santé/Collège Canadien Des Directeurs de Services de Santé*, *21*(4), 44–49. https://doi.org/10.1016/S0840-4704(10)60055-5

Holbeche. (n.d.). *High performance organization*. Butterworth-Heinemann, Copyright © 2005 Elsevier Ltd. All rights reserved

Intarakumnerd, P., & Goto, A. (2018). Role of public research institutes in national innovation systems in industrialized countries: The cases of Fraunhofer, NIST, CSIRO, AIST, and ITRI. *Research Policy*, *47*(7), 1309–1320. https://doi.org/10.1016/j.respol.2018.04.011

Jones-Roberts, A. (2008). Change management in a home care nursing service: A partnership to improve organization performance. *Home Health Care Management and Practice*, *21*(1), 54–60. https://doi.org/10.1177/1084822308318186

Judge, W., & Douglas, T. (2009). Organizational change capacity: The systematic development of a scale. *Journal of Organizational Change Management*, *22*(6), 635–649. https://doi.org/10.1108/09534810910997041

Judge, W. Q., & Elenkov, D. (2005). Organizational capacity for change and environmental performance: An empirical assessment of Bulgarian firms. *Journal of Business Research*, *58*(7), 893–901. https://doi.org/10.1016/j.jbusres.2004.01.009

Judge, W. Q., Naoumova, I., & Douglas, T. (2009). Organizational capacity for change and firm performance in a transition economy. *The International Journal of Human Resource Management*, *20*(8), 1737–1752. https://doi.org/10.1080/09585190903087107

Karp, T., & Helg, T. I. T. (2008). From change management to change leadership: Embracing chaotic change in public service organizations. *Journal of Change Management*, *8*(1), 85–96. https://doi.org/10.1080/14697010801937648

Kickert, W. J. M. (2014). Specificity of change management in public organizations: Conditions for successful organizational change in Dutch ministerial departments. *American Review of Public Administration*, *44*(6), 693–717. https://doi.org/10.1177/0275074013483871

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Press.

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine, 15*(2), 155–163.

Kuchinke, K. P. (1995). Managing learning for performance. *Human Resource Development Quarterly*, *6*(3), 307–316. https://doi.org/10.1002/hrdq.3920060309

Lee, M. D. P. (2008). A review of the theories of corporate social responsilibity: Its evolutionary path and the road ahead. *International Journal of Management Reviews, 10*, 53–73. https://doi.org/10.1111/j.1468-2370.2007.00226.x

Lei, H., Phouvong, S., & Le, P. B. (2019). How to foster innovative culture and capable champions for Chinese firms: An empirical research. *Chinese Management Studies*, *13*(1), 51–69. https://doi.org/10.1108/CMS-05-2018-0502

Lim, S., Kim, M., & Sawng, Y. W. (2022). Design thinking for public R&D: Focus on R&D performance at public research institutes. *Sustainability (Switzerland)*. https://doi.org/10.3390/su14137765

Pradana, A. W., Asmara, A. Y., Triyono, B., Jayanthi, R., Dinaseviani, A., & Nashihuddin, W. (2021). Analisis *desk research* kebijakan *technology transfer office* sebagai solusi hambatan teknologi transfer di Lembaga Litbang Indonesia. *Matra Pembaruan: Jurnal Inovasi Kebijakan, 5*(1), 1–12. https://doi.org/10.21787/mp.5.1.2021.1-12

Pudjiarti, E. S. (2018). Elements of entrepreneurship in private universities: Organizational change capacity, innovative capability, and the performance. *Journal of Entrepreneurship Education*, *21*(2).

Purwadi, P., Asmara, A. Y., Nashihuddin, W., Pradana, A. W., Dinaseviani, A., & Jayanthi, R. (2020). Inovasi pelayanan publik di China: Suatu pembelajaran bagi pemerintah dalam peningkatan layanan publik di Indonesia. *Jurnal Administrasi dan Kebijakan Publik, 5*(1), 86–113. https://doi.org/10.25077/jakp.5.1.86-113.2020

Ramezan, M., Sanjaghi, M. E., & Hassan, R. K. B. (2013). Organizational change capacity and organizational performance: An empirial analysis on an innovative industry. *Journal of Knowledge-Based Innovation in China*, *5*(3), 188–212. https://doi.org/10.1108/jkic-07-2013-0012

Rothwell, W. J., Stavros, J. M., & Sullivan, R. L. (2015). *Practicing organization development: Leading transformation and change* (4th ed.). https://doi.org/10.1002/9781119176626

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2014). Partial least squares structural equation modeling. In *Handbook of market research*. Springer.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization.* New York: Doubleday.

Son, H., Chung, Y., & Hwang, H. (2019). Do technology entrepreneurship and external relationships always promote technology transfer? Evidence from Korean public research organizations. *Technovation*, *82–83*, 1–15. https://doi.org/10.1016/j.technovation.2019.02.005

STEPI (2021). *Policy consultation on the arrangement of science, technology, and innovation (STI) governance: S&T think tank, R&D program evaluation, and S&T laws and regulations*. 정책연구.

Triyono, B., Hardiyati, R., & Pradana, A. W. (2020). The gap between program planning and implementation: The case of R&D program in Indonesian RPJMN. *STI Policy and Management Journal, 5*(2), 137–146. https://doi.org/10.14203/STIPM.2020.285

Van der Voet, J., Kuipers, B. S., & Groeneveld, S. (2015). Held back and pushed forward: Leading change in a complex public sector environment. *Journal of Organizational Change Management, 28*(2), 203–213.

Wold, H. (1982). Soft modeling: The basic design and some extensions. In *Systems under indirect observations part II* (pp. 1–54). North-Holland, Amsterdam.